

REMARKS/ARGUMENTS

Applicant responds herein to the Office Action dated July 27, 2004.

In the outstanding office action dated 07/27/2004, claims 1-8 were examined. By way of the outstanding office action claims 1-8 stand rejected under 35 U.S.C. 102(e) as being anticipated by Tokuo et al, U.S. Patent No. 6,701,898.

Claim 1 has been amended and claim 5 has been canceled.

Claims 1-4 and 6-8 are Allowable.

Claim 1 stands rejected under 35 U.S.C. 102(b) as being anticipate by Tokuo et al.

Claim 1 has been amended to include the subject matter disclosed in paragraph [0030] of the original specification.

Amended claim 1 recites, in part, that the force exerted by the spring of the actuator is significantly less than the force exerted by the pressure on the valve body of the intake valve, and the control unit comprises control means for driving the electromagnetic actuator by means of a pulse of current of short and constant duration.

As disclosed in paragraph [0030] of the specification:

"It is important to note that the control unit 7 can control the electromagnet 27 with a pulse of current of limited and constant duration (for example, less than 2 msec when the piston 13 is actuated at 3000 rpm); in fact, once the electromagnet 27 has taken the push rod 24 to the passive position, attracting the armature 28 to itself, the intake valve 16 closes and a relatively high pressure is generated almost instantaneously inside the cylinder 12, which pressure exerts on the valve body 18 of the intake valve 16 a force significantly greater than that exerted by the spring 26 of the actuator 25. Therefore, if the electromagnet 27 also ceases to act, the spring 26 of the actuator 25 is not capable of reopening the intake valve 16 until the pressure inside the cylinder 12 has fallen to relatively low values, that is, until the beginning of the next intake phase of the cylinder 13. The fact of actuating the electromagnet 27 with a pulse of current of limited and constant duration is decidedly advantageous, in that it allows energy consumption by the electromagnet 27 to be limited to the absolute minimum, it allows the costs of the respective electrical circuits to be reduced since they can have dimensions suitable for working with very

low dissipated electric power, and it allows the drive circuits of the electromagnet 27 to be simplified." (emphasis added).

Tokuo et al discloses (column 4, lines 25-43):

"In other words, in this operating condition, the engine requires almost no extra output torques and fuel consumption is small. The delivery flow rate control in this case is performed by applying a drive signal to the actuator 8 once every two reciprocating motions of the plunger 2. In one out of every two delivery strokes the fuel is not delivered and the delivery flow in the remaining delivery stroke is controlled to control the average delivery flow in the two compression strokes. In the delivery stroke that controls the delivery flow, a drive signal is applied to the actuator 8 at a timing advanced from a target delivery start timing by a time interval equal to the response delay of the actuator 8. This retracts the rod 91 to allow the suction valve 5 to close so that the fuel can be compressed and delivered at the target delivery start timing. The delivery flow produced by the two compression strokes is equal to the delivery flow of this one compression stroke. The timing and duration at which the drive signal is applied to the actuator 8 is calculated by the controller 57." (emphasis added).

From the above, it is evident that the duration of the drive signal is not constant and it is calculated by the controller 57. This is also clear by comparing figure 2 and figure 3. It is evident that the drive signal has two different durations.

Thus, Tokuo et al does not disclose or even suggest to drive the electromagnetic actuator by means of a pulse of current of short and constant duration. Accordingly, Tokuo et al cannot anticipate amended claim 1.

Moreover, there simply cannot be a valid *prima facie* case of obviousness based even in part on the Tokuo et al reference. In order to reach the invention as claimed by claim 1, one would have to completely disregard the teachings given by Tokuo et al, which expressly show to drive the electromagnetic actuator by means of a pulse of current of variable duration. There would be no suggestion to discard these teachings without using applicants own disclosure as a template, and no such suggestion can be found in the reference in any event. "To establish *prima facie* obviousness of a claimed invention, all the claim limitations must be taught or suggested by the prior art" MPEP § 2143.03. As stated above, Tokuo et al does not disclose or even suggest

to relate to drive the electromagnetic actuator by means of a pulse of current of short and constant duration. The other references add nothing of relevance to claim 1.

Accordingly, claim 1 is allowable. Claims 2-4 and 6-8 depending from claim 1 are also allowable.

CONCLUSION

In view of the foregoing remarks, it is submitted that the claims as now appearing in this application are in good and proper form for allowance.

Accordingly, the Examiner is respectfully requested to reconsider the application, allow the claims as amended and pass this case to issue.

I hereby certify that this correspondence is being deposited with the United States Postal Service with sufficient postage as First Class Mail in an envelope addressed to: Mail Stop Amendment, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on October 18, 2004

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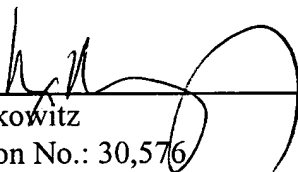
Name of applicant, assignee or
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Signature

October 18, 2004

Date of Signature

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